FLUKE®

PA 4281A

Instruction Sheet

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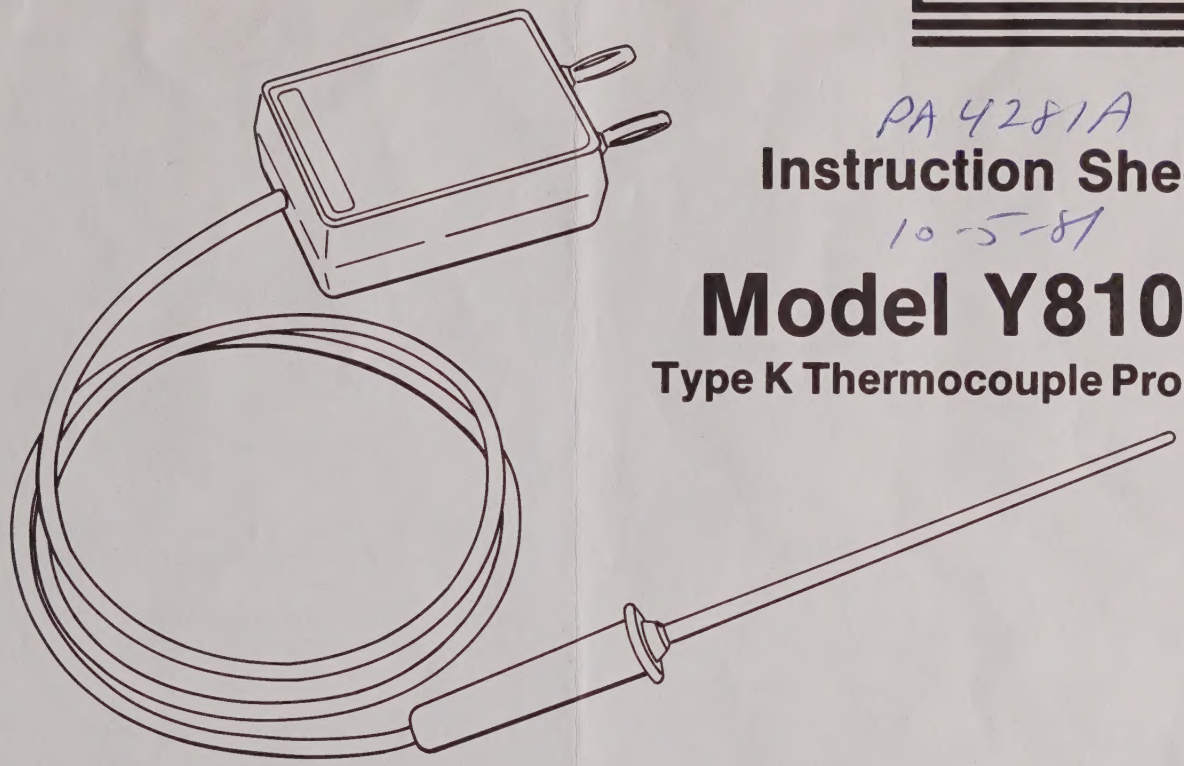
Model Y8102

Type K Thermocouple Probe



WARNING

TO AVOID ELECTRICAL SHOCK, DO NOT USE THIS PROBE WHEN VOLTAGES EXCEEDING 30V AC RMS OR 60V DC ARE PRESENT. THE PROBE TIP IS ELECTRICALLY CONNECTED TO THE OUTPUT TERMINALS.

INTRODUCTION

The Y8102 Type K Thermocouple Probe can be used for almost any application, but is best suited for use as a liquid-immersion-type probe. The Inconel sheath around the probe tip protects the thermocouple junction.

Specifications

Type: K (Chromel vs Alumel).

Accuracy (with respect to NBS tables): ±2.2°C (4°F) over the range of 0°C to 276.7°C (32°F to 530°F). ±3/4% of temperature over the range of 276.7°C to 926.7°C(530°F to 1700°F).

Time Constant: 10 seconds (for air at room temperature and on atmosphere of pressure moving at 65 ft/sec).

Sampling Tip:

Maximum Temperature Rating: 927°C (1700°F).

Sheath Material: Inconel.

Dimensions: 3.175 mm (1/8 inch) in diameter. 15.24 cm (6 inches) in length

Grounding: Junction welded to sheath.

Electrical: (nominal)

Output: 25°C (77°F) = 1.00 mV (Reference junction at 0°C)

Seebeck Coefficient: 25°C (77°F) = 40.50 μV/°C

Handle Maximum Temperature Rating: 204.4°C (400°F) continuous.

Conductors:

Type: K.

Size: AWG #24 stranded (7 strands of #32).

Length: 48 inches nominal

Insulation:

Voltage Rating: 1000V (between wire and outside of both layers of insulation).

Maximum Temperature Rating: 105°C (220°F) continuous.

Color Coding and Polarity:

Chromel: + yellow

Alumel: – red.

Connector: Dual Banana Isothermal Termination (3/4 inch spacing)

Protection Class 3: Relates solely to insulation or grounding properties defined in IEC 348.

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MEASUREMENT CONSIDERATIONS

Instrument Compatibility

The Y8102 is designed to be used with voltmeters and multimeters that have dual banana female input jacks spaced at 0.75 inch and built-in reference junction compensation. The compensation is accomplished by the fact that the thermocouple wires are connected directly to the male banana plugs inside the probe's termination housing. When plugged into a voltmeter or multimeter, the termination housing provides thermal isolation from the surrounding environment so that the male plugs (and thermocouple connections) can assume the same temperature as the voltmeter or multimeter input jacks. The compensation circuit inside the voltmeter or multimeter senses the temperature of the input jacks and corrects the output reading for varying ambient temperatures. If the probe termination has been stored at a temperature that is different from the voltmeter or multimeter, a stabilization period of several seconds will be required after the probe is connected.

Temperature Limitations

The probe tip of the Y8102 has a continuous temperature rating of 927°C. However, the opposite end of the sheath nearest the handle should not be subjected to temperatures greater than 204°C (400°F) due to the maximum temperature limitation of the handle and the epoxy which attaches the wire at the transition.

Media Limitations

The Inconel sheath material of the Y8102 is an alloy of chromium and nickel. It has excellent resistance to oxidation and corrosion at high temperatures, but it should not be used in the presence of sulfur above 537°C (1000°F).

OPERATION

Use the following procedure to operate the Y8102:

1. Select and energize a compatible voltmeter or multimeter.

2. Connect the probe to the voltmeter or multimeter input terminals designated for temperature function.

3. Select the temperature function.

4. Select the temperature range.

5. With no heat source applied to the probe tip, the local ambient temperature should be displayed on the voltmeter or multimeter. if not, see the troubleshooting section below to locate the difficulty.

TROUBLESHOOTING

When proper temperature readings cannot be obtained, use the following procedure to isolate the difficulty:

1. Voltmeter/Multimeter Operation

   a. Verify both function and range selection on the voltmeter/multimeter.

   b. Verify that the thermocouple is connected to the correct input terminals with proper polarity.

   c. On voltmeter/multimeters using the mA input for the temperature function, check the mA fuse.

   d. Remove the thermocouple and insert a pair of test leads into the temperature input terminals. Short the test leads together and observe the display. If the previous steps have been completed and the voltmeter/multimeter is functioning properly, the display will indicate ambient room temperature when the leads are shorted together.

2. Thermocouple Operation

   a. Connect the thermocouple to the k ohm input terminals. Select the k ohm function, 200 ohm range, and observe the reading. A typical thermocouple will indicate a resistance of less than 10 ohms.

   b. Select dc volts function, 200 mV range and observe the display. With the probe tip at ambient temperature, the thermocouple output voltage should be very near zero.

   c. Grasp the probe tip with your finger tips. The display should indicate a few tenths of a millivolt positive polarity.

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